

What is Claimed is:

1. A control apparatus for an internal combustion engine having a plurality of cylinders and switching means for switching between an all-cylinder operation in which all of said plurality of cylinders are operated and a partial-cylinder operation in which at least one of said plurality of cylinders is halted, said control apparatus comprising:

operating parameter detecting means for detecting at least one operating parameter of said engine;

instructing means for instructing said switching means to perform the all-cylinder operation or the partial-cylinder operation according to the at least one operating parameter;

atmospheric pressure detecting means for detecting an atmospheric pressure; and

inhibiting means for inhibiting the partial-cylinder operation when the detected atmospheric pressure is lower than a predetermined pressure.

2. A control apparatus according to claim 1, wherein said operating parameter detecting means detects a load on said engine and a rotational speed of said engine, and said instructing means instructs said switching means to perform the partial-cylinder operation, when the detected load on said engine is less than a determination threshold value and the detected engine rotational speed is lower than a predetermined rotational speed.

3. A control apparatus according to claim 2, further comprising:
vehicle speed detecting means for detecting a running speed of a vehicle driven by said engine; and

gear position detecting means for detecting a gear position of a transmission of said vehicle,

wherein the determination threshold value is set according to the detected running speed and the detected gear position.

4. A control apparatus for an internal combustion engine having a

plurality of cylinders and switching means for switching between an all-cylinder operation in which all of said plurality of cylinders are operated and a partial-cylinder operation in which at least one of said plurality of cylinders is halted, said control apparatus comprising:

load detecting means for detecting a load on said engine;

atmospheric pressure detecting means for detecting an atmospheric pressure;

determination threshold value setting means for setting a determination threshold value according to the detected atmospheric pressure; and

instructing means for instructing said switching means to perform the partial-cylinder operation when the detected load on said engine is lower than the determination threshold value.

5. A control apparatus according to claim 4, wherein said determination threshold value setting means sets the determination threshold value to a value that decreases as the atmospheric pressure becomes lower.

6. A control apparatus according to claim 4, further comprising:

vehicle speed detecting means for detecting a running speed of a vehicle driven by said engine; and

gear position detecting means for detecting a gear position of a transmission of said vehicle,

wherein said determination threshold value setting means calculates a load threshold value according to the detected running speed and the detected gear position, and calculates the determination threshold value by correcting the load threshold value according to the detected atmospheric pressure.

7. A control method for an internal combustion engine having a plurality of cylinders and a switching mechanism for switching between an

all-cylinder operation in which all of said plurality of cylinders are operated and a partial-cylinder operation in which at least one of said plurality of cylinders is halted, said control method comprising the steps of:

- a) detecting at least one operating parameter of said engine;
- b) instructing said switching mechanism to perform the all-cylinder operation or the partial-cylinder operation according to the at least one operating parameter;
- c) detecting an atmospheric pressure; and
- d) inhibiting the partial-cylinder operation when the detected atmospheric pressure is lower than a predetermined pressure.

8. A control method according to claim 7, wherein said step a) of detecting at least one operating parameter of said engine includes the step of detecting a load on said engine and a rotational speed of said engine, and the partial-cylinder operation is performed when the detected load on said engine is less than a determination threshold value and the detected engine rotational speed is lower than a predetermined rotational speed.

9. A control method according to claim 8, further comprising the steps of:

- i) detecting a running speed of a vehicle driven by said engine; and
 - ii) detecting a gear position of a transmission of said vehicle,
- wherein the determination threshold value is set according to the detected running speed and the detected gear position.

10. A control method for an internal combustion engine provided with a plurality of cylinders and a switching mechanism for switching between all-cylinder operation in which all of said plurality of cylinders are operated and partial-cylinder operation in which at least one of said plurality of cylinders is halted, said control method comprising the steps of:

- a) detecting a load on said engine;
- b) detecting an atmospheric pressure;

c) setting a determination threshold value according to the detected atmospheric pressure; and

d) instructing said switching mechanism to perform the partial-cylinder operation when the detected load on said engine is lower than the determination threshold value.

11. A control method according to claim 10, wherein the determination threshold value is set to a value that decreases as the atmospheric pressure becomes lower.

12. A control method according to claim 10, further comprising the steps of:

i) detecting a running speed of a vehicle driven by said engine;

ii) detecting a gear position of a transmission of said vehicle; and

iii) calculating a load threshold value according to the detected running speed and the detected gear position,

wherein the determination threshold value is calculated by correcting the load threshold value according to the detected atmospheric pressure.

13. A computer program for causing a computer to carry out a control method for an internal combustion engine having a plurality of cylinders and a switching mechanism for switching between an all-cylinder operation in which all of said plurality of cylinders are operated and a partial-cylinder operation in which at least one of said plurality of cylinders is halted, said control method comprising the steps of:

a) detecting at least one operating parameter of said engine;

b) instructing said switching mechanism to perform the all-cylinder operation or the partial-cylinder operation according to the at least one operating parameter;

c) detecting an atmospheric pressure; and

d) inhibiting the partial-cylinder operation when the detected

atmospheric pressure is lower than a predetermined pressure.

14. A computer program according to claim 13, wherein said step a) of detecting at least one operating parameter of said engine includes the step of detecting a load on said engine and a rotational speed of said engine, and the partial-cylinder operation is performed when the detected load on said engine is less than a determination threshold value and the detected engine rotational speed is lower than a predetermined rotational speed.

15. A computer program according to claim 14, wherein said control method further comprises the steps of:

- i) detecting a running speed of a vehicle driven by said engine; and
- ii) detecting a gear position of a transmission of said vehicle,

wherein the determination threshold value is set according to the detected running speed and the detected gear position.

16. A computer program for causing a computer to carry out a control method for an internal combustion engine provided with a plurality of cylinders and a switching mechanism for switching between all-cylinder operation in which all of said plurality of cylinders are operated and partial-cylinder operation in which at least one of said plurality of cylinders is halted, said control method comprising the steps of:

- a) detecting a load on said engine;
- b) detecting an atmospheric pressure;
- c) setting a determination threshold value according to the detected atmospheric pressure; and
- d) instructing said switching mechanism to perform the partial-cylinder operation when the detected load on said engine is lower than the determination threshold value.

17. A computer program according to claim 16, wherein the determination threshold value is set to a value that decreases as the

atmospheric pressure becomes lower.

18. A computer program according to claim 16, wherein said control method further comprises the steps of:

- i) detecting a running speed of a vehicle driven by said engine;
- ii) detecting a gear position of a transmission of said vehicle; and
- iii) calculating a load threshold value according to the detected running speed and the detected gear position,

wherein the determination threshold value is calculated by correcting the load threshold value according to the detected atmospheric pressure.